Computer Tools to Support Collaborative Organization Design: Definition and Analysis of the Work at The Vanderbilt University Hospital and Clinic

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In November, 1993 The Vanderbilt University Hospital and Clinic (VUH/TVC) convened a 10-member Collaborative Organization Design (COD) team that represented a diagonal slice through the organization. This team, lead by Gelinas & James, an outside consulting firm, was charged to develop, recommend, and implement a new organizational design which would promote a stronger patient focus, increased efficiency, and lower costs. The COD process is structured to inspire and enable employees to rebuild their organization so that it can respond to the challenges and opportunities that exist within their environment, to customer needs, and their own aspirations. This manuscript describes several of the computer tools which were utilized in the definition and analysis of the work of patient care at VUH/TVC. Specific examples of the findings from this phase of the work are utilized to illustrate their use and value.

INTRODUCTION

At no time in recent history have all the financial resources of academic medical centers been under direct attack simultaneously as they are today. To compete successfully in this new health care environment, academic institutions must reduce their costs dramatically while maintaining or even improving the quality of health care that they deliver (UHC, 1993). In response to these imparitives many organizations are in the midst of some sort of corporate reorganization (Boyce, 1992), be it restructuring (Bostrom, 1993), reengineering (Hammer, 1993) redesigning their organizational charts (Penchansky, 1993), empowering their employees (Dveirin, 1993), implementing total quality management (TQM) (Hamilton, 1993), or continuous quality improvement (CQI) programs, cross-training their employees (Lyons, 1992), implementing team management (Kerfoot, 1992; Meyer, 1994), or trying to change their organization's culture to name but a few of the current topics in organizational change. Most of these change efforts result in only temporary improvements in quality or reductions in cost in a limited area of the organization. The depth and scope of the change that is required and the resources that must be brought to bear are often sorely underestimated (Gelinas, 1992).

In an attempt to overcome these shortcomings, the Vanderbilt University Hospital (VUH) and Clinic (TVC) convened a 10-member collaborative organization design (COD) team, representing a diagonal slice through the organization, to review all aspects of the current organization and then suggest several major new directions.

What is Collaborative Organizational Design?

Collaborative organizational design (COD) is an organizational redesign process structured to inspire and enable members of the organization to rebuild their organization so that it can respond to the challenges and opportunities that exist within their environment, to customer needs, and their own aspirations (Gelinas, 1992). One of the most important tenets of the COD process is that before profound change can occur, everyone within the organization must agree on the problems. Therefore, the COD process is designed so that those expected to do the rebuilding will understand, be involved in, and support the entire process.

Simply stated, the COD process utilizes the best techniques from organizational systems theory, organization redesign, work reengineering, visioning, collaborative problem solving, and quality improvement programs to create a clear and easily understood process which will have a major impact on the organization (Gelinas, 1992).

The COD process is divided into six phases: Education and Planning, Definition and Analysis, Mission and Vision, Design, Implementation Planning, and Implementation and Evaluation. The specific goals for analyzing the work of VUH/TVC within the Definition and Analysis phase were:

1. To define, analyze, and document the current state of work surrounding patient care at VUH/TVC.
2. To identify strengths and problems of current work processes and their root causes.
3. To obtain agreement on definition and analysis of the work at VUH/TVC among all organization members.

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This manuscript describes several of the computer tools that have proved useful during the definition and analysis phase of this work. Specific examples taken from the work done are used to illustrate computer tool usage.

BACKGROUND

Vanderbilt University Hospital (VUH) is a 661-bed tertiary care academic medical facility located on the campus of Vanderbilt University in Nashville, TN. In Fiscal Year 1993 (FY'93) there were 28,126 inpatient admissions. The Vanderbilt Clinic (TVC) is an outpatient clinic physically connected to VUH. In FY'93 there were 408,000 outpatient visits. VUH/TVC currently employs over 5000 people of which over 1400 are nurses and 530 are housestaff. In addition, there are over 630 attending physicians on staff.

Why computer tools?

The collaborative organization design process is, by its very nature, highly interactive involving a large percentage of Vanderbilt's 6,000 members. Computer tools can help support this process in several different ways. First, they provide a rapid method for documenting in a neat and orderly fashion all the work that the various groups do. For example, flow charting tools can be used to diagram the current work processes (see figure 2). Second, they provide an on-line method for helping groups focus on the central problems during brainstorming sessions. For example, a computer-based Affinity Diagramming tool allows group members to identify different aspects of a particular problem that are responsible for a portion of the problem (see figure 3). Third, use of the OptionFinder (Option Technologies, Inc.) electronic balloting software enabled groups of over 80 individuals to express their level of agreement (or disagreement) with specific questions and then to see the overall group response instantaneously. Finally, computer-aided instruction has the potential to change the way students of all kinds learn by providing the new information at the time that it is needed (just-in-time) rather than just-in-case it is needed as we often do now. Specifically, the Continuous Improvement Toolkit provides on-line instructions and examples for use, as well as, the theory of the continuous quality improvement methodology behind the Toolkit (Bourne, 1993).

The Continuous Improvement Toolkit (CI Toolkit)

The CI Toolkit was developed by John R. Bourne, Ph.D. Director of the Center for Intelligent Systems at Vanderbilt University in conjunction with Northern Telecom's Quality Department. The CI Toolkit leads one through the various phases of a complete continuous quality improvement project. Specifically, the CI Toolkit allows one to identify and document the customers, the products and services the organization delivers to those customers, the suppliers of the input materials, flowchart the work processes, assign performance measures to the steps in the work process (i.e., time, cost, number of defects, and customer satisfaction), determine present performance, identify benchmarks against which the present performance should be compared, identify/prioritize opportunities for improvement, and develop an improvement plan. The CI Toolkit also includes a suite of quality tools such as a fishbone, or cause and effect diagram, control charts, Pareto Diagram, scatter plots, and histogram. We utilized the CI Toolkit's flow charting capability to document current work processes at VUH/TVC (fig 2).

Analysis of Work Processes at VUH/TVC

Work Processes are sets of interconnected activities, organized in time, through which the inputs obtained from the suppliers are transformed into deliverables which we provide to our customers (see figure 1). Some work processes may be contained solely within a single department, although most work processes cut across traditional departmental boundaries. Work processes are vital to the very existence of the organization. Clear organizational strategies, logical reporting relationships, and a skilled, committed work force are all necessary, but can not overcome flawed work processes.

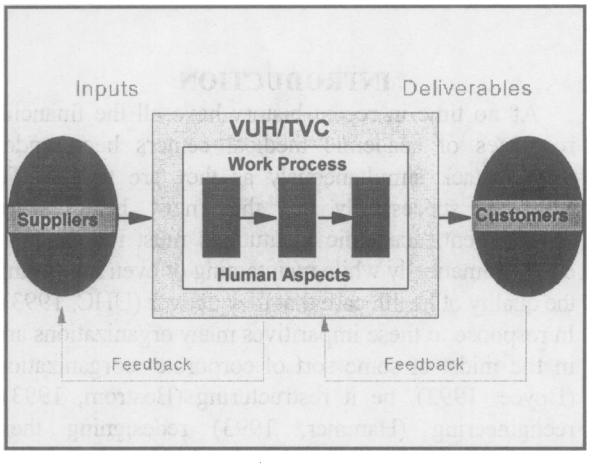

Figure 1. A Diagram showing how the work processes transform the inputs, received from the suppliers, into deliverables which we give to our customers. The human aspects of the organization reflect on the willingness and committment of the workers to actually do the work. Customer feedback is used to help us make improvements in our work processes. In addition, we provide feedback to the suppliers to help them deliver supplies which better meet our needs (from Gelinas, 1992).

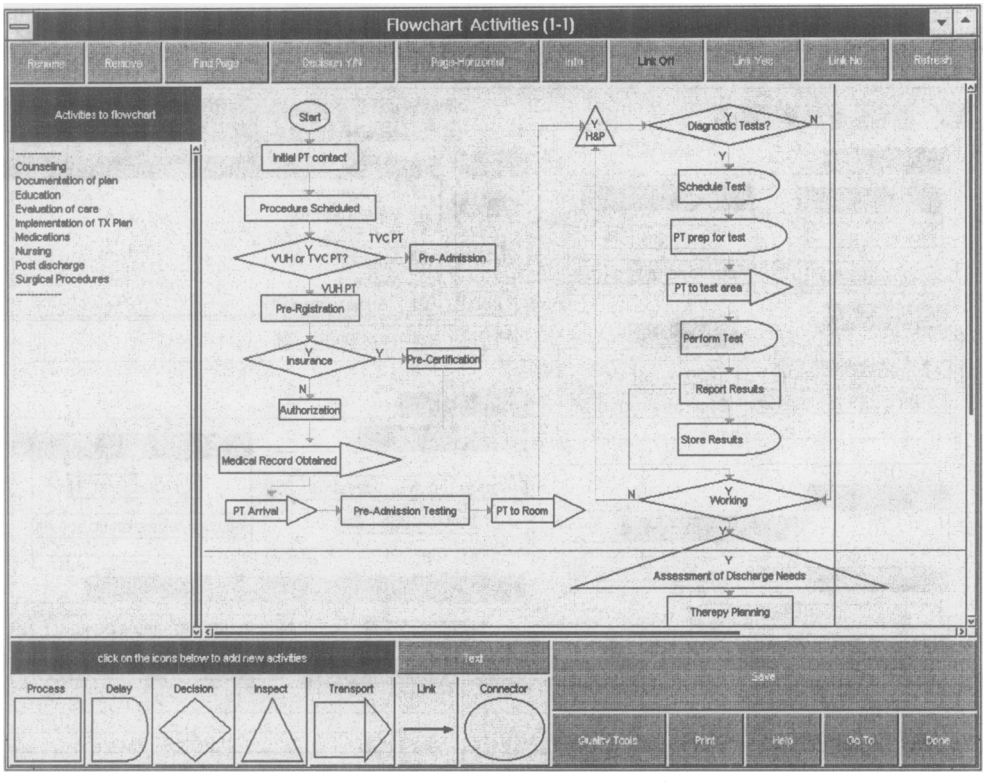

Figure 2. A sample screen from the CI Toolkit showing a partial flowchart of the patient care work process .

Following identification of the core work processes of VUH/TVC, we began a series of meetings with small groups of employees in an attempt to identify the root causes of some of the most serious problems faced by the institution. At several of these meetings, participants engaged in brainstorming activities. In response to these meetings, we developed a computer-based version of the Affinity Diagramming tool.

The Affinity Diagram Tool

The Affinity Diagram method is derived from the KJ Method developed by Dr. Kawakita Jiro. Briefly, the Affinity diagram uses the affinity between partial, piecemeal items of verbal data to help one understand the structure of the overall problem in a systematic fashion. To construct an Affinity Diagram using the new tool one:

1. Decides on the theme or topic to be discussed.
2. Begins collecting verbal data (i.e., facts, inferences, ideas, or opinions). This process is typically unstructured and is referred to as brainstorming.
3. These ideas are then iteratively arranged and rearranged on the computer screen as related ideas begin to coalesce.
4. Once the ideas, concepts, or opinions are arranged in a neat and organized fashion, the group begins to state their "belief" in the correctness or importance of each item.

The Affinity Diagram tool we have created then utilizes the Dempster-Shafer theory of evidence to combine and propagate these beliefs throughout the diagram (Gordon, 1984). Currently our tool only allows one person's beliefs to be input into the system, but it would only require a small change in the code (but a large change in the physical hardware, i.e., multiple machines connected by a network) to allow the entire group to "vote" on importance or relevance of each item.

Findings from the Work Process Analysis

During the myriad meetings with employee and customer focus groups, we identified several strengths of VUH/TVC. The following list provides an overview of these findings.

Strengths Identified:
We take care of patients who need our help.
Most staff want to do a good job.
We can obtain most (test, consultation, information, etc.) that is needed.
VUH/TVC is a "fine teaching laboratory".
There is an administrative commitment to improve and develop a better organization.
VUH/TVC has the potential to be great.
There are "pockets" of staff trying to help.

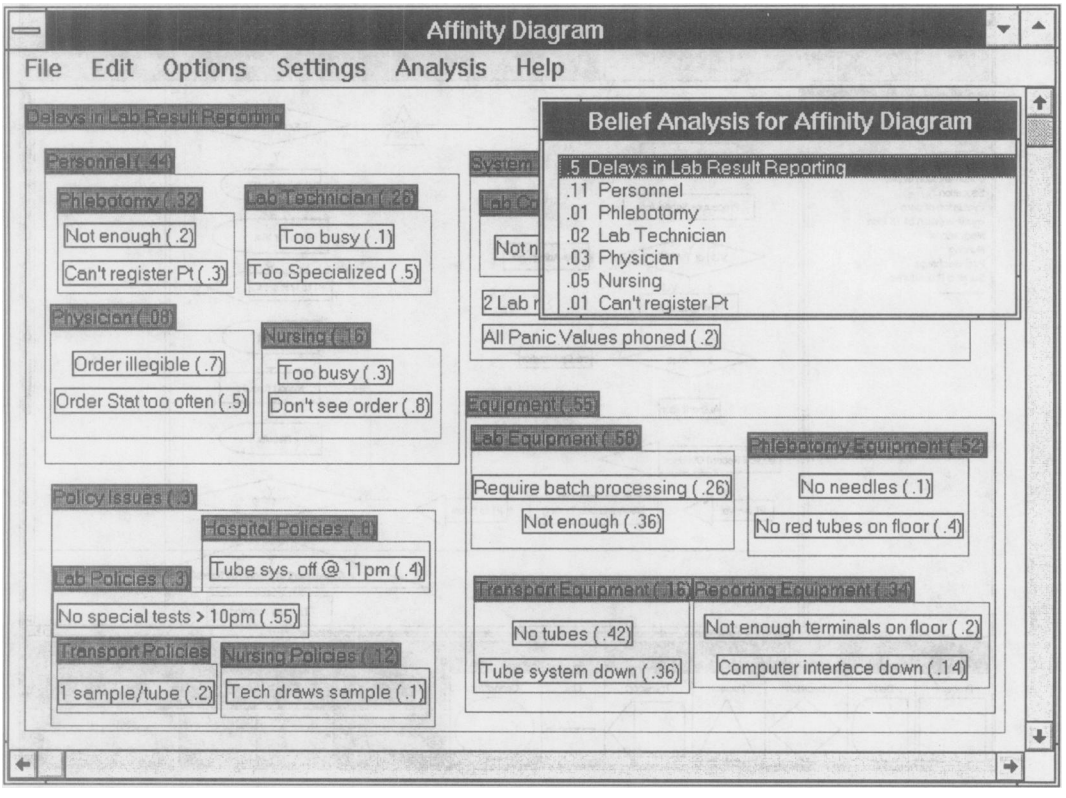

Figure 3. Sample screen from the Affinity Diagram tool. The small window in the upper righthand corner shows a portion of the belief calculations based on the Dempster-Shafer theory of evidence.

In addition, a myriad of problems surrounding the patient care work process were identified. The following list was an attempt to identify the root causes of the many problems.

Problems/Causes Identified:

1. Accessing the services provided is difficult.
2. Patients/families needs and expectations are not always a priority.
3. Data are initially entered incorrectly or not available.
4. There is inappropriate/inefficient use of services and resources.
5. Information/data is non-existent or difficult to access and no systematic feedback mechanism exists.
6. Faculty and staff do not understand how their decisions/actions affect other departments or the institution as a whole.
7. Communication throughout the organization is difficult.

Finally, these focus groups identified several of the major impacts of the problems which result from the root causes identified above.

Impacts Identified:

Patient treatment is delayed.
Patients get mad and do not come back.
There is increased patient cost.
There is decreased patient, staff, & faculty satisfaction.
There is increased length of stay.
Physicians send patients elsewhere.
There is reduced reimbursements from payors.

OptionFinder: Interactive Meeting Software

The OptionFinder (Option Technologies, Inc.) hardware and software set-up enables a large group of people to vote and have the groups' responses displayed immediately following the vote. Briefly, OptionFinder utilizes individual, wireless, portable keypads (3"x 6" x 1") which communicate with a central receiving station via radio waves. The central receiving station is connected to an IBM-compatible 386 with 4 Mb of RAM (min. config.) and approx. 20Mb of disk space .

OptionFinder not only helps teams work together more effectively during a meeting, but can also help teams learn to work together to organize, plan, and facilitate meetings. We utilized the OptionFinder in two large meetings (approximately 80 participants each) at which the findings from the work process analysis were presented (see Figure 4).

To what extent do the findings from the work process analysis match your view of VUH/TVC?
1. Off Target.
2. Needs Work.
3. I can Live with it.
4. Close.
5. Bull's eye.

Figure 4. A replica of one question the audience was asked to answer.Participants chose answer from menu.

Immediately following this question, we were able to show the following bar chart of their responses.

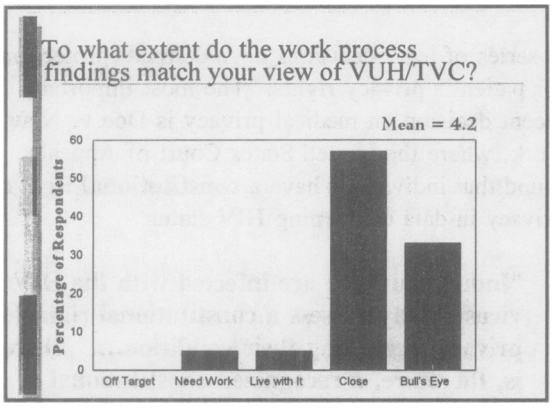

Figure 5. Graph of audience response.

DISCUSSION & SUMMARY

Use of the computer tools described in this manuscript has enabled the COD team to accomplish a great amount of work in a short time. We originally planned to use the CI Toolkit during meetings (via projection equipment) to record the work processes as they were identified. Even though the flow charting tool is easy to use, we found that using large Post-it notes was even faster and easier. The CI Toolkit found its major use following the meetings to document the work that had gone on.

The Affinity diagramming tool was likewise found to be most useful as a documentation tool. When we have the hardware necessary to allow us to use the Affinity diagramming tool's ability to combine the votes from a large group, then it may become useful as a realtime meeting facilitation tool.

Finally, the OptionFinder software has been instrumental in our success. As we have repeated in nearly every meeting, the main tenet of the COD process is that we cannot hope to to agree on the solutions if we cannot agree on the problems. The OptionFinder, in conjunction with the CI Toolkit and Affinity Diagramming tool, have allowed the COD team to move on into the Mission and Vision phase with good agreement by all the major stakeholders within VUH/TVC on the problems, root causes, and impacts identified.

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Acknowledgements

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